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CANADA DEPARTMENT OF AGRICULTURE

COMMON SCAB OF POTATO[1]

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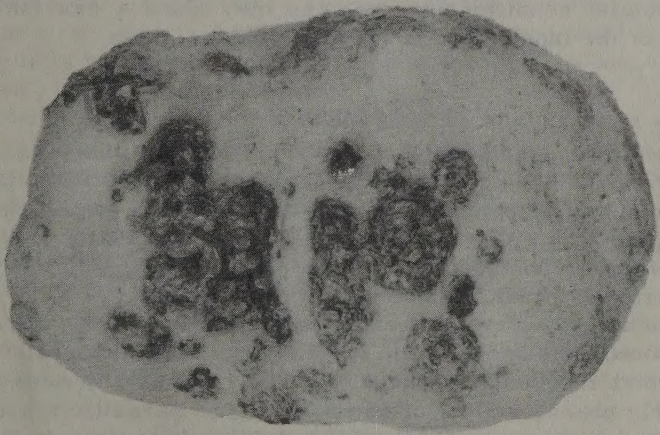

Common Scab of Potato

Common scab is world-wide in occurrence and has been known for more than 100 years in both Europe and America. The first account of this disease was published in 1825. The greatest loss from scab is brought about by a lowering of the market grade of potatoes. Although the disease does not appear to be detrimental to the eating qualities, scabby potatoes have poor consumer appeal and are wasteful because of the deep paring required. They are undesirable for seed and are more liable to decay in storage than healthy tubers. Inasmuch as traces of scab disqualify certified seed stock, and considering Canada's large seed potato industry, it is obvious that the occurrence of this disease presents a problem of considerable economic importance.

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Turnips, sugar beets, garden beets carrots, parsnips, and radishes are also affected by common scab.

SYMPTOMS

The first symptoms of common scab appear as minute reddish or brownish surface lesions on the young tubers. These start most frequently around the lenticels or breathing pores. These lesions usually increase in size, become darker in color, and develop into the typical somewhat circular scab-like areas occurring singly or with several infected spots that often combine to form a large mass. They may vary from slight skin russeting to greatly roughened corky areas above, at, or below the surface of the tuber. Under moist conditions the lesions may show a grayish moldy growth of the fungus that causes the disease.

CAUSE

The organism causing common scab of potatoes was at first believed to be a single species. It is now generally recognized that a number of species of actinomycetes, all belonging to the genus Streptomyces, are capable of causing potato scab. The most important of these species, Streptomyces scabies (Thaxter) Waksman & Henrici, was first described in 1890.

The actinomycetes are an ill-defined group having characteristics common to bacteria and fungi. They are common soil organisms which frequently produce the musty, or earthy odor typical of freshly plowed soil or of composts. The parasitic types causing potato scab are capable of living for a long time in the soil. They thus form a part of the microbiological population of the soil and have been found in virgin soils.

The scab organism promotes the formation of cork which, in turn, results in the thickening of the base and edges of the scab lesion. Young tubers are more readily attacked than older ones. The scab organism attacks only growing tubers, not those in storage.

PREDISPOSING FACTORS

The development of the scab-producing organism, and consequently, the amount of scab, is greatly influenced by the nature and abundance of organic matter in the soil, soil reaction, and the presence of antagonistic organisms. Moisture, temperature, and aeration are also very important predisposing factors. Scab is more abundant on tubers grown in dry soils. It does not occur in important amounts in soils having an acid reaction equivalent to a

pH of 5.2 or less, but is likely to be most severe in soils which are neutral, slightly acid, or slightly alkaline in reaction.

CONTROL

Control of the common scab disease has been attempted by practising precautionary measures and crop rotation and by utilizing seed and soil treatments.

The first of these measures aims at avoiding any practice which favors scab development. Injudicious liming of potato fields is probably the greatest single practice to be curtailed. Where liming is necessary, the application should be made in the current season, after harvesting the potato crop, and this soil should not be limed again until potatoes reappear in the rotation, a period of at least three years. A half-ton or less of finely ground limestone will usually be the maximum amount to apply in the manner indicated to most medium acid soils.

Growers should refrain from directly adding large amounts of fresh manure or organic debris to potato soils, and they should discontinue the practice of piling and burning dead potato tops in the field. This latter practice eventually leads to the development of alkaline areas that usually favor scab development.

Crop rotation is valuable because it prevents the planting of potatoes on the same soil two years in succession, a common practice to be discouraged. There is some evidence that in the rotation some crops may be more beneficial than others in reducing the amount of scab, but the subject requires more extensive investigation.

The seed treatments utilized commonly in the past were either inorganic or organic mercury compounds, or dilute solutions of formalin. None of these chemical treatments are of value in preventing infection of the developing potato crop, although they are of some value in killing the scab organisms that are borne more or less superficially on the seed pieces.

Soil treatment with sulphur has been practised but as use of this chemical requires extreme care and attention to technical details it is not advocated. In recent years there has been some tendency to make heavy applications of ammonium sulphate to infested soils, far in excess of the requirements of the potato crop. While some control has been achieved by this measure, its use appears to be costly. It is recommended, however, that this compound be employed in supplying the normal nitrogen requirements of the potato crop, especially when the potatoes are produced on mildy scab-infested soils.

The most effective way of controlling the common scab disease is to plant scab-resistant potato varieties. Although because of climatic conditions and physiologic races of the organism this measure may not always be satisfactory, it is far superior to any of the other control methods.

Six resistant varieties are worthy of trial by growers who have trouble with the common scab disease. These are: Cherokee, Menominee, Ontario, Seneca, Cayuga and Osage. The first of these varieties, Cherokee, has the added advantage of being resistant to some races of the late blight fungus, and of being earlier maturing than the others. The Osage variety lacks blight resistance but is an early, shallow-eyed Cobbler type. Cayuga and Seneca are somewhat disappointing in many areas because of their low yield, and the Ontario and Menominee are often late and immature at digging time. The suitability of any of these varieties may be measured only by its performance for the grower and acceptance by the trade.